NOTES

A PRELIMINARY LIST OF FISHES COLLECTED FROM RICHARDSON BAY, CALIFORNIA 1972–1973

From June 1972 to July 1973 sampling of fish eggs and larval, juvenile and adult fishes was conducted by Tiburon Fisheries Laboratory (National Marine Fisheries Service, NOAA) in Richardson Bay, a part of the San Francisco Bay system (Fig. 1). The sampling was part of a pilot program to lead toward a more extensive baseline study of fishery resources and their ecological relationships within and dependence upon San Francisco Bay.

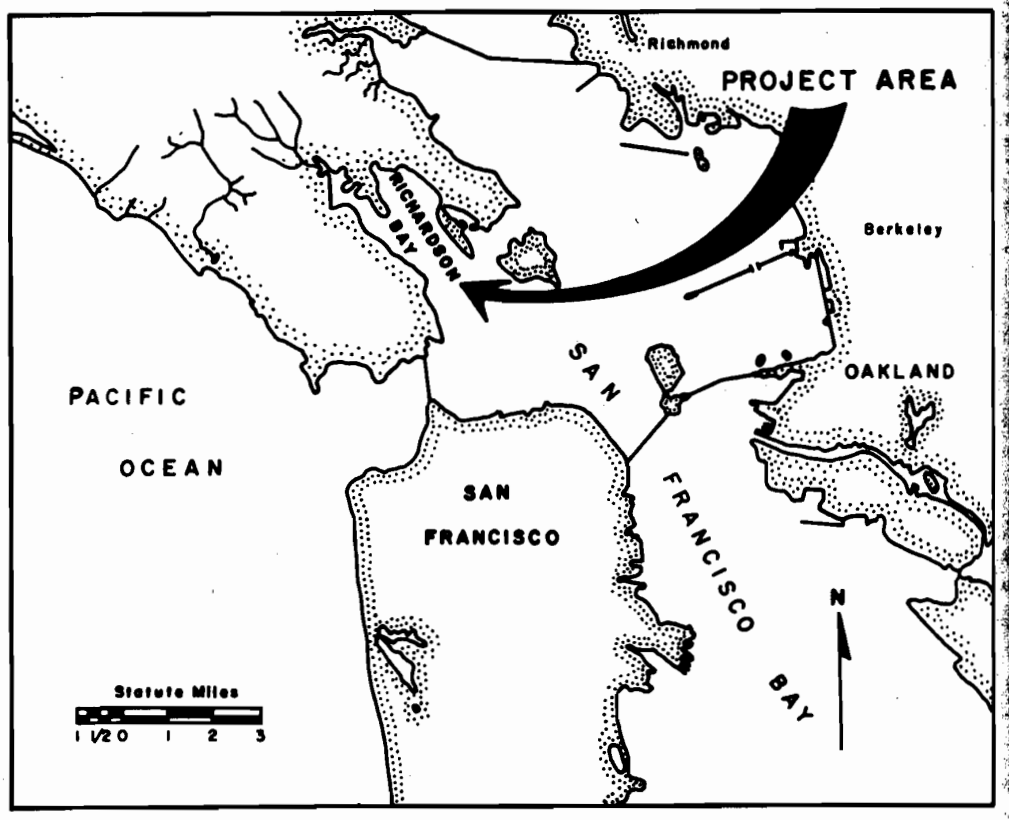

FIGURE 1. Location Map.

Sampling for adult and juvenile fishes was conducted with gill nets and trawls at 9 randomly selected stations each month with the exception of October 1972. The gill nets used were 6 ft in depth by 100 ft long and made of monofilament nylon. Each net was constructed from different panels laced together. The mesh sizes of these panels were randomly selected from 1, 1½, 2, 2½, 3, 4 and 6 inch stretched mesh, each size being used twice in the four nets that we used. At each station selected, one net was fished for 2 hours at the surface. Often, in waters less than 6 ft deep, the nets covered the entire water column.

The trawl was a standard shrimp "try net" with head rope length

TABLE 1—**Fishes Collected From Richardson Bay, 1972–1973**

Scientific name	Common name	Eggs or larvae collected	Number of juveniles or adults captured
Mustelus henlei	Brown smoothhound		38
Triakis semifasciata	Leopard shark		42
Squalus acanthias	Spiny dogfish		1
Raja trachura	Roughtail skate		1
Myliobatis californica	Bat ray		4
Acipenser medirostris	Green sturgeon		3
Alosa sapidissima	American shad		1
Clupea harengus pallasi	Pacific herring	x	22
Dorosoma petenense	Threadfin shad		7
Engraulis mordax	Northern anchovy	x	9
Hypomesus pretiosus	Surf smelt		5
Porichthys notatus	Plainfin midshipman		16
Merluccius productus	Pacific hake	x	
Microgadus proximus	Pacific tomcod		34
Brosmophycis marginata	Red brotula	x	
Atherinops affinis	Topsmelt		265
Atherinopsis californiensis	Jacksmelt		351
Syngnathus griseolineatus	Bay pipefish	x	14
Morone saxatilis	Striped bass		72
Trachurus symmetricus	Jack mackerel	x	
Cynoscion nobilis	White seabass	x	
Genyonemus lineatus	White croaker		1
Cymatogaster aggregata	Shiner perch		1,716
Embiotoca jacksoni	Black perch		49
Hyperprosopon argenteum	Walleye surfperch		23
Hypsurus caryi	Rainbow seaperch		9
Micrometrus minimus	Dwarf perch		133
Phanerodon furcatus	White seaperch		1,353
Rhacochilus toxotes	Rubberlip seaperch		8
Rhacochilus vacca	Pile perch		93
Neoclinus uninotatus	Onespot fringehead		1
Clevelandia ios	Arrow goby		1
Lepidogobius lepidus	Bay goby		3
Peprilus simillimus	Pacific pompano		1
Sebastes auriculatus	Brown rockfish		9
Hexagrammos decagrammus	Kelp greenling		1
Ophiodon elongatus	Lingcod		16
Enophrys bison	Buffalo sculpin		2
Leptocottus armatus	Pacific staghorn sculpin	x	176
Oligocottus maculosus	Tidepool sculpin	x	
Scorpaenichthys marmoratus	Cabezon		1
Citharichthys sordidus	Pacific sanddab	x	7
Citharichthys stigmaeus	Speckled sanddab		165
Paralichthys californicus	California halibut	x	
Hypsopsetta guttulata	Diamond turbot	x	3
Parophrys vetulus	English sole		674
Platichthys stellatus	Starry flounder	x	70
Symphurus atricauda	California tonguefish	x	

of 20 ft and foot rope of 23½ ft. Otter boards measured 1 ft by 2 ft and were hung from 10 ft bridles. Mesh size in the main body of the net was 1⅜ inch stretched mesh with 1 inch stretched mesh in the cod end. The trawl was always fished on the bottom. At each station, one 3-minute tow was made at a speed of 3.5 knots.

Ichthyoplankton was sampled with surface plankton tows using a half-meter net and on 24-hr monitoring stations using an anchored channel net (Lewis, *et al.* 1970). Three-minute tows were made in replicates of two at 15 randomly selected stations each 6 weeks. Each 12 weeks, 24-hr monitoring was conducted at 2 fixed stations, one in the main ship channel off the Corps of Engineers dock in Sausalito, the other inside Cone Rock, near the mouth of Richardson Bay. The

direction of the channel net was reversed at each tidal change.

All of the juvenile and adult fish sampling and surface plankton tows were conducted during daylight hours.

This preliminary list (Table 1.) of fishes collected and their relative abundance in the catch is published here for the possible interest of other workers in the shallow areas of San Francisco Bay. Two species in this list have not to my knowledge been reported previously from San Francisco Bay: roughtail skate (*Raja trachura*) and white seabass (*Cynoscion nobilis*). Unaware of its rarity, I identified the male roughtail skate in the field, using Miller and Lea's (1972) guide and returned it to the water. It was caught in the trawl on May 31, 1973. The white seabass larva was collected and identified by Maxwell Eldridge (Tiburon Fisheries Laboratory) in June 1972. Identification was verified by Elbert H. Ahlstrom. The specimen is preserved in the reference collection at Tiburon Fisheries Laboratory.

I do not presume that the list is completely representative of fishes found in Richardson Bay. Shortcomings of gear and sampling methods normally preclude this possibility. Much of the plankton material is still being worked up. We expect additional species will show up in these collections. More detailed publications will follow a more intensive examination of our data and collected materials.

REFERENCES

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Miller, D. J. and R. N. Lea. 1972. Guide to the coastal marine fishes of California. Calif. Dep. Fish and Game, Fish Bull. (157): 1–235.

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Accepted June 1974.

CHANGES IN THE SPECIES COMPOSITION OF SHARKS IN SOUTH SAN FRANCISCO BAY

Sharks were collected in San Francisco Bay between the Dumbarton and San Mateo Bridges between May, 1972 and April, 1973. Data collected from this 57 km ^{2} (22 mile ^{2}) area were used to examine cyclic changes in shark species composition. Herald (1951) using data compiled from the annual summer shark derbies at Coyote Point located 3.2 km (2 miles) north of this collecting area, noted yearly changes in species composition and abundance. This is the first published study examining the general seasonal changes in shark abundance and species composition in San Francisco Bay.

Marine Ecological Institute, Redwood City, California, provided the 78-foot research vessel, *Inland Seas*, for the collection of specimens. Collection stations are shown in Figure 1. Catches from all stations have been combined for analysis.

The three capture methods used in this study were: otter trawl, deployed from the *Inland Seas*; a twelve hook set line, deployed alongside the anchored vessel; and rod and reel. The latter two methods used No. 3 snelled hooks. Cut anchovy was used for bait.

CALIFORNIA FISH AND GAME

VOLUME 61 APRIL 1975 NUMBER 2

Published Quarterly by
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME